

Decomposition by a Pair of Plates 175

acid, still the effects were the same: so that if, for a moment[^] the mercury might be supposed to supply the metallic contact, the inversion of the amalgamated piece destroys that objection. The use of *unamalgamated zinc* (615) removes all possibility of doubt.¹

619. When in pursuance of other views (665), the vessel *c* was made to contain a solution of caustic potash in place of acid, still the same results occurred. Decomposition of the iodide was effected freely, though there was no metallic contact of dissimilar metals, and the current of electricity was in the *same direction* as when acid was used at the place of excitement.

620. Even a solution of common salt in the glass *c* could produce all these effects.

621. Having made a galvanometer with platina wires, and introduced it into the course of the current between the platina plate and the place of decomposition *x*, it was affected, giving indications of currents in the same direction as those shown to exist by the chemical action.

622. If we consider these results generally, they lead to very important conclusions. In the first place, they prove, in the most decisive manner, that *metallic contact is not necessary for the production of the voltaic current*. In the next place, they show a most extraordinary mutual relation of the chemical affinities of the fluid which *excites* the current, and the fluid which is *decomposed* by it.

623. For the purpose of simplifying the consideration, let us take the experiment with amalgamated zinc. The metal so prepared exhibits no effect until the current can pass: it at the same time introduces no new action, but merely removes an influence which is extraneous to those belonging either to the production or the effect of the electric current under investigation (736); an influence also which, when present, tends only to confuse the results.

¹ The following is a more striking mode of making the above elementary experiment. Prepare a plate of zinc, ten or twelve inches long and two inches wide, and clean it thoroughly: provide also two discs of clean platina, about one inch and a half in diameter:—dip three or four folds of bibulous paper into a strong solution of iodide of potassium, place them on the clean zinc at one end of the plate, and put on them one of the platina discs: finally dip similar folds of paper or a piece of linen cloth into a mixture of equal parts nitric acid and water, and place it at the other

end of the zinc-plate with the second platina disc upon it. In this state of things no change at the solution of the iodide will be perceptible; but if the two discs be connected by a platina (or any other) wire for a second or two, and then that over the iodide be raised, it will be found that the *whole* of the surface beneath is deeply stained with *evolved iodine*.—December 1838.